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**FMPC IMPLEMENTATION PLAN FOR DOE
ORDER 5480.11, "RADIATION PROTECTION FOR
OCCUPATIONAL WORKERS"**

08/06/90

**DOE-1566-90
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16
MEMORANDUM**

United States Government

Department of Energy

Oak Ridge Operations

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memorandum

AUG 06 1990

DATE: DOE-1566-90

REPLY TO: DP-84:Jalovec

ATTN OF:

SUBJECT: **FMPC IMPLEMENTATION PLAN FOR DOE ORDER 5480.11, "RADIATION PROTECTION FOR OCCUPATIONAL WORKERS"**

TO: John A. Ford, DP-142, GTN

Attached is the revised Implementation Plan for DOE Order 5480.11. This plan supersedes the previous plan and the first revision transmitted to you on June 11, 1990. The attached revision presents an updated program status and provides more detail on cost and schedules. Information on exemptions to 5480.11, mitigating actions, and prioritization of items, is discussed below.

Exemptions are requested for the following sections or portions of these sections: 9g(2) "Monitoring Internal Radiation"; 9g(3)(a) "Workplace Air Monitoring"; 9g(4) "Contamination Control and Monitoring"; 9i "Releases of Materials and Equipment from Radiological Areas"; 9l "Entry Control Program"; 9m "Records"; and 9o(3) "Radiation Safety Training -- Radiation Protection Technician." Specific requirements for which exemptions are requested and interim mitigating actions are identified in the attached plan. The interim mitigating actions for contamination control are detailed in Attachment II as prepared in response to Admiral Watkins memorandum dated June 6, 1990, "Control of Radioactive Contamination."


Since the previous Implementation Plan was submitted, sources of funding have been identified. This has allowed implementation actions to proceed, although the scheduled completion dates for some items have been extended because the funding was not identified by February 28, 1990. GPP funding for construction of shielded monitoring stations in production buildings and field locations has not been identified at this time. If funding cannot ultimately be redirected for this effort, alternative methods for complying with the monitoring requirement at exits from Radiological Areas will be developed. The schedule in the attached Implementation Plan does not depend on additional funding.

FMPC is pursuing the following activities, listed in order of priority, in order to meet 5480.11 requirements:

- o Communicate the requirements of 5480.11 to all plant personnel, and describe anticipated methods for complying.
- o Purchase state-of-the art personnel contamination monitors, to assure that no contamination leaves a controlled area.
- o Strengthen and formalize Radiological Safety Technician training.
- o Develop occupational radon monitoring program adequate to identify 100 mrem annual exposure due to intake, and demonstrate adequacy of internal monitoring program for other nuclides.
- o Proceed with the vehicle survey upgrade project to improve the vehicle and equipment monitoring controls.
- o Revise site policies and procedures to reflect the changes, and train FMPC personnel accordingly.
- o Establish controls between controlled and radiological areas. Set up shielded, weather resistant frisking stations and satellite clothing facilities to prevent spreading contamination between these areas.
- o Establish new clothing requirements to further minimize the risk of spreading contamination.
- o Upgrade personnel exposure records to facilitate combining internal and external exposures.

The details of the cost estimates provided in the Implementation Plan can be discussed at your convenience.

If your staff has any questions, please ask them to call Jay Jalovec at FTS 774-6008.


Gerald W. Westerbeck
FMPC Site Manager

Attachments: As stated

cc w/att.:

L. Furr, DP-142, GTN
C. Newton, DP-142, GTN

IMPLEMENTATION PLAN FOR DOE ORDER 5480.11, "RADIATION PROTECTION OF OCCUPATIONAL WORKERS"

I INTRODUCTION

This plan describes the method by which the Feed Materials Production Center will implement DOE Order 5480.11. It supersedes the plan submitted on June 11, 1990. The plan is divided into one-time tasks with associated costs and recurring costs that will be required to maintain compliance. Most of the recurring costs are due to increased staffing requirement. The final section contains scheduled compliance dates for those sections of 5480.11 where WMCO was not in compliance on January 1, 1990.

The basis for the cost estimates used in subsequent sections are as follows: Labor costs are based on estimated times and projected mix of professional, supervisory, technical and clerical personnel. Material and supply costs are based primarily on the number of people serviced (e.e. the quantity of protective clothing to obtain, number of people to frisk, etc. For capital equipment, studies were performed to determine types and numbers needed. The type of instrument chosen is based on meeting 5480.11 requirements. The number of instruments is based on required plant locations, projected location usage, etc. Some construction activity will be needed to install frisking booths.

- A. Upgrade radon monitoring program to provide internal radiation monitoring program for personnel who may annually receive 100 mrem or more from inhalation of radon and progeny.

1. Major Activities

- a. Purchase additional instrumentation.
- b. Identify and prepare monitoring locations.
- c. Develop system for recording employee occupancy in affected areas.

2. Estimated Costs

	<u>Operating</u>	<u>Capital Equipment</u>	<u>GPP</u>
Estimated Total	\$70,000	\$48,000	\$0

3. Schedule

- o Identify instruments and locations - July 1990
- o Determine specification and write purchase requisitions - August 1990
- o Complete any required procedures and training - November 1990
- o Install equipment; Set-up program - December 1990
- o Initiate Program - February 1991

4. Status: Field-testing of passive radon monitoring devices is nearing completion. The devices are being analyzed and a report will be written. A task team is investigating additional instrumentation needs to adequately characterize all site areas and monitor personnel.

5. Cost Details: The above operating costs cover labor and expense items such as track recorders. The capital equipment costs cover such items as Working Level Monitors, alpha scintillation devices, readout instrumentation, etc. The type and number of devices will be determined by the task team discussed above. Note, the recent emphasis on mitigating radon exposures, and the magnitude of the effort at the FMPC has resulted in increased involvement by several groups. This involvement will likely compensate for the funds not originally budgeted. The increased scope of the effort will, however, extend the scheduled completion date to February 1991.

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6. Justification for Exemption: The program for assessing radon intakes will differ markedly from other internal monitoring programs because it will not rely on bioassay. Care must be taken in establishing appropriate indoor radon background levels, so that the contribution due to occupational sources can be quantified.
7. Mitigating Actions: Periodic radon sampling is performed in process buildings. Radon surveys of administrative buildings, administered by UNC Geotech, did not identify any generally occupied areas that exceed 4 pCi/L.

B. Demonstrate compliance with ANSI N13.30.

1. Major Activity

- a. Evaluate bioassay measurement capabilities as described in ANSI N13.30, and document results.

2. Estimated Cost

	<u>Operating</u>	<u>Capital Equipment</u>	<u>GPP</u>
Estimated Total	\$15,000	\$0	\$0

3. Schedule

Completion

- | | |
|-------------------------------|----------------|
| o Receive verification sample | September 1990 |
| o Complete draft report | November 1990 |
| o Complete evaluation | December 1990 |

4. Status: In vitro compliance activities, which depend on testing samples at other locations, will extend the completion date to December 1990.

5. Cost Details: The costs cover WMC0 labor charges.

II. ONE-TIME TASKS (CONT'D)

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C. Upgrade radiological postings to comply with 5480.11 requirements.

1. Major Activities

- a. Procure signs with 5480.11 terminology.
- b. Identify areas requiring posting.
- c. Post signs.

2. Estimated Costs

	<u>Operating</u>	<u>Capital Equipment</u>	<u>GPP</u>
Estimated Total	\$90,000	\$0	\$0

3. Scheduled Completion Date: May 15, 1990

4. Status: Completed on time.

5. Cost Details: The costs covered charges for signs and labor costs for installing the signs and communicating these upgrades to plant personnel.

D. Install continuous air monitors (CAMs) in Airborne Radioactivity Areas.

1. Major Activities

- a. Identify required locations.
- b. Purchase additional CAMs.
- c. Prepare monitoring locations.
- d. Install CAMs

2. Estimated Costs

	<u>Operating</u>	<u>Capital Equipment</u>	<u>GPP</u>
Estimated Total	\$ 10,000	\$115,000	\$0

3. Scheduled Completion Date: February 1991

4. Status: Purchase requisitions for needed equipment have been written and are in the review process.

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5. Cost Details: Capital equipment costs are for alpha spectrometry-based alpha CAMs, capable of distinguishing uranium from radon progeny. Operating costs are for air sample pumps and WMCO labor.
 6. Justification for Exemption: Funding for the required equipment was not available until recently.
 7. Mitigating Actions: Elimination of uranium production has curtailed airborne activity. Respiratory protection is frequently prescribed based on potential for generation of airborne activity, rather than on measured airborne concentrations. Due to its low specific activity, significant airborne uranium concentrations are typically visible; this mitigates the need for CAMs.
- E. Install air samplers in areas where annual exposures could exceed 100 mrem.
1. Major Activities
 - a. Identify required locations.
 - b. Purchase additional air samplers.
 - c. Prepare monitoring locations.
 - d. Purchase automatic alpha/beta counter for filter analysis.
 - e. Install Samplers.

2. Estimated Costs

	<u>Operating</u>	<u>Capital Equipment</u>	<u>GPP</u>
Estimated Total	\$160,000	\$31,000	\$0

3. Scheduled Completion Date: February 1991.
4. Status: See Item D, 4. Additional staffing needed for monitoring location and installing samplers.
5. Cost Details: Capital cost is for filter counting instrument. Operating costs are for air sampling equipment and WMCO labor.
6. Justification for Exemption: Funding for the required air sampling equipment was not available until recently.
7. Mitigating Actions: Elimination of uranium production has curtailed airborne activity. Respiratory protection is prescribed conservatively.

II. ONE-TIME TASKS (CONT'D)

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F. Continue implementation of the ORO Radioactive Contamination Control Policy (ORORCCP), initiate entry control and release of materials and equipment from radiological areas, and characterization of contaminated soil and gravel.

1. Major Activities

- a. Develop soil characterization methodologies and determine instrument needs.
- b. Purchase additional contamination monitoring instrumentation.
- c. Establish barriers and/or controls between Radiological and Controlled Areas.
- d. Establish and prepare monitoring and control points at Radiological Area/Controlled Area interfaces.
- e. Purchase weather enclosures for field monitoring.
- f. Purchase additional personnel monitoring equipment (Hand & Foot Monitors, Stand-in Portal type monitors).
- g. Construct shielded monitoring stations in production buildings and field locations.
- h. Install equipment, institute program.

2. Estimated Costs

	<u>Operating</u>	<u>Capital Equipment</u>	<u>GPP</u>
Estimated Total	\$220,000	\$1,115,000	\$2,800,000*

3. Scheduled Completion Date: September 30, 1991.

4. Status: (items below correspond to identical items in F.1., above.)

- a. Appropriate instrumentation for soil characterization has been identified. Purchase requisitions have been written and are in the review process.
- b. Purchase requisitions have been written and are in the review process.
- c. Plant areas are currently being characterized to delineate Radiological/Controlled area interfaces.

*Estimated requirement; funding not yet identified.

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d. Same as c.

e&g. WMC0 is investigating the possibility of fabricating monitoring stations using FMPC site personnel. The requirements for shielding will be established during the plant characterization (items c and d, above).

f. The specifications for whole body contamination monitors are nearing completion.

5. Cost Details: GPP cost is for construction of shielded contamination monitoring stations in production buildings and field locations as well as weather enclosures for field monitoring. Capital equipment costs are for personnel contamination monitors and hand-and-foot monitors. Operating costs are for soil characterization instrumentation, contamination monitoring instruments, Radiological Area barriers, and WMC0 labor.

6. Justification for Exemption: Funding for the required equipment was not available until recently.

7. Mitigating Actions: These were provided previously (Reference 3).

G. Upgrade radiation exposure records.

1. Major Activities.

a. Computerize internal dosimetry records required for REIRS report.

b. Establish data base and reporting format for providing exposure reports to employees.

2. Estimated Costs

	<u>Operating</u>	<u>Capital Equipment</u>	<u>GPP</u>
Estimated Total	\$80,000	\$0	\$0

3. Estimated Completion Date: December 31, 1990.

4. Status: on schedule.

5. Cost Details: Costs are for WMC0 labor.

6. Justification for Exemption: Funding for the required staff was not available until CY-1990.

7. Mitigating Actions: Bioassay results above the FMPC action level trigger prompt dose assessments, so that special exposure controls for individuals can be imposed if necessary. Elimination of uranium production has sharply reduced external radiation exposure and potential for internal exposure.

H. Upgrade training for Radiological Safety technicians.

1. Major Activities

- a. Develop training requirements and lesson plans for all Radiological Safety technician grades.
- b. Initiate training program.
- c. Submit for accreditation.

2. Estimated Costs

	<u>Operating</u>	<u>Capital Equipment</u>	<u>GPP</u>
Estimated Total	\$80,000	\$0	\$0

3. Scheduled Completion Date: September 30, 1991
4. Status: on schedule.
5. Cost Details: Costs are for WMCO labor and training materials.
6. Justification for Exemption: Funding for the required staff was not available until recently.
7. Mitigating Actions: New technicians are selected based largely on prior nuclear experience. Sign-off sheets are used to document that new hires have demonstrated their ability to perform prescribed tasks prior to unsupervised assignment to those tasks.

III RECURRING COSTS

A. Increased Radiological Safety staffing

1. Activities requiring additional staff

- a. Workplace and equipment contamination surveys.
- b. Support air sampling and monitoring.
- c. Maintain and calibrate additional instruments.

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2. Estimated Costs (Annual, starting FY-91)

	<u>Operating</u>	<u>Capital Equipment</u>	<u>GPP</u>
Estimated Total	\$870,000	\$0	\$0

3. Status: Not available. FY-91 budget is in the early stages of development.

B. Increased Operations staffing

1. Activities requiring additional staff

- a. Cleaning and decontamination
- b. Transportation through control points between Radiological and Controlled Areas.
- c. Operate laundry and maintain change areas in production buildings and warehouses.

2. Estimated Costs (Annual, starting FY-91)

	<u>Operating</u>	<u>Capital Equipment</u>	<u>GPP</u>
Estimated Total	\$1,160,000	\$0	\$0

3. Status: Not available. FY-91 budget is in the early stages of development.

C. Maintenance and calibration costs for new instrumentation.

1. Activities requiring funding

- a. Purchase repair parts and/or calibration equipment for Working Level Monitors, CAMs, air samplers and monitoring instrumentation, Hand and Foot Monitors and Portal Monitors.
- b. Provide vendor calibrations for Working Level Monitors and other instruments as required.

2. Estimated Costs (Annual, starting FY-91)

	<u>Operating</u>	<u>Capital Equipment</u>	<u>GPP</u>
Estimated Total	\$60,000	\$0	\$0

3. Status: Not available. FY-91 budget is in the early stages of development.

IV REGULATED AREA EXIT MONITORING LOCATIONS

A. Facilities

To complete transition from the present system of one monitoring location at the egress point from the whole process area to a system of egress points from each established Regulated Area it will be necessary to establish a number of new monitoring locations. A total of 29 egress locations have been identified from the process buildings. An additional 15 monitoring locations have been identified at egress points from grounds areas which require control due to contamination. Establishing these monitoring locations is complicated by the need for shielding at most of the locations due to the general area background level.

Hand and Foot Monitor locations have been identified at the following specific building egress points:

Building #	1a	South center
	1b	North East corner North West corner
	2a	North East corner South center West center
	2b	East
	4a	South East South West North West
	5	South East East wall North East
	6	South West East wall North West
	8	North center West center South West

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9 South wall
 North wall
 30a North wall
 37 North center
 54a North center
 South center
 64 East wall, North end
 East wall, South end
 69 North West
 71 South wall

B. Grounds

Personnel monitoring (portable frisker) locations have been identified at the following egress points from ground areas controlled due to contamination or contamination potential. Small weather enclosures with electrical power, telephones, and shielding will be required at each location.

- . Exit from K-54 area
- . 2nd Street at West fence guard station
- . 1st Street, North of building 13b
- . 1st Street, North West of building 15
- . 1st Street, North East of building 46
- . "D" Street, South West of Plant 6
- . "D" Street, North West of Plant 6
- . "E" Street, East of building 32
- . Fence exit, East of building 69
- . Gamma Street, North of building 12b
- . "B" Street, North East of building 30a
- . Road between buildings 60 and 63
- . "B" Street "Y" North East of building 56
- . Fence exit North East of building 71
- . Fence exit North of building 66

V

COMPLIANCE DATES

<u>DOE 5480.11 Section</u>	<u>Compliance Date</u>
9 g (2), "Monitoring Internal Radiation"	February 1991
9 g (3) (a), "Workplace Air Monitoring"	February 1991
9 g (4), "Contamination Control and Monitoring"	September 1991
9 i, "Releases of Materials and Equipment from Radiological Areas"	September 1991
9 k, "Posting and Labeling"	May 1990

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DOE 5480.11 SectionCompliance Date

9 l, "Entry Control Program"

September 1991

9 m, "Records"

December 1990

9 o (3), "Radiation Safety Training - Radiation
Protection Technician"

September 1991

FEED MATERIALS PRODUCTION CENTER (FMPC)

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CONTAMINATION AREA SIZE REDUCTION ACTIONS

Contaminated areas where no future work is projected will be decontaminated, decommissioned, or placed in cold standby. In addition, the entire Controlled Area is being characterized for radioactive contamination. Decontamination will be performed to reduce Contaminated Areas and keep non-Contaminated Areas below the limits. Actions such as purchasing additional instrumentation, improving soil characterization techniques, and expanding the routine monitoring and surveying program are planned to control contamination.

NEAR-TERM CORRECTIVE ACTIONS

The FMPC has upgraded its contamination control program to be as consistent with DOE Order 5480.11 as possible. Some examples are as follows:

- a. Personnel and material monitoring is required upon exiting Contamination and Controlled Areas
- b. Vehicles and occupants are surveyed before leaving the FMPC.
- c. Random whole body frisking is performed by Radiological Safety technicians to confirm the adequacy of contamination control procedures.
- d. Video cameras have been installed at selected locations so that usage of hand and foot monitors can be observed.
- e. Radiological postings with the DOE Order 5480.11 terminology are now being used at the FMPC.
- f. In May 1990, 345 personnel and their hand-carried items were monitored. No contamination was detected. This program will continue indefinitely or until the new whole body personnel monitors are installed.

FULL COMPLIANCE ACTIONS

FMPC compliance with 5480.11 will be achieved by implementation of the actions stated in the FMPC DOE Order 5480.11 Implementation Plan. Specific actions are as follows:

- Purchase additional personnel monitoring equipment, including whole body contamination monitors which will be used when exiting a Controlled Area.
- Establish new clothing requirements. Anti-contamination clothing will be worn in contaminated areas only. Clothing satellites will be installed. Personal clothing will not be allowed in contaminated areas.

(Continued)

- Proceed with the vehicle survey upgrade project to establish better vehicle monitoring controls and practices.
- Establish barriers between Controlled and Radiological Areas and control movement of material from one area to another.
- Establish control entry/exit points for all Radiological Areas and set up frisking stations with necessary equipment, step-off pads, instructions, protective equipment requirements, etc.
- Revise facility policies and procedures to reflect changes and train personnel accordingly.

The date for full compliance with DOE Order 5480.11 is targeted for September 1991.